Water Advisory Bulletin

A 2nd round of testing for PCE at sites identified as having vinyl-lined asbestos cement water mains is underway. A total of 3 rounds will be conducted in order to establish a Date-Base and to determine future monitoring requirements in accordance with the Department of Environmental Protection "Tetrachloroethylene (PCE) Monitoring Program". All results will be published.

Latest results for PCE testing are as follows:

Seabury Point, House #80, 3/31-2.9, 3/28-1.7, 3/27 bleeder increased 7GPPM, 3/24-4.5, 3/20-6.0; Stonegate Lane, House #58, 3/31-ND, 3/24ND; Stockade Path, House #94, 3/31-ND, 3/24-0.6; Tanglewood Tr., House #67, 3/31-0.9, 3/24-1.8; Cottontail Dr., House #138, 3/31-ND, 3/24-ND; Plantation Dr., House #129, 3/31-ND, 3/24-ND; So. River West, House #75, 3/31-0.8, 3/24-1.0; So. River East, House #64, 3/31-1.6, 3/24-1.6; Bayberry Lane, House #422, 3/29-1.4; Torrey Lane, House #40, 3/29-ND; Meadow Lane, 3/29-ND; Hitty Tom Rd., House #73, 3/29-0.5; Wildflower Path, House #4, 3/29-ND; Trout Farm Lane, House #54, 3/29-ND; Buckboard Rd., 3/29-ND. ND-Not Detected. Detection limit is 0.5 ppb.

The following questions and answers regarding Tetrachloroethylene and Vinyl Lined AC Water Mains has been provided by the town's consultant Camp Dresser & McKee Inc. of Cambridge to help answer questions the public might have.

Some Questions and Answers Regarding Vinyl-Lined Asbestos-Cement Water Main

March 31, 1997

Q. Why is this type of water main of concern?

A. Vinyl-lined asbestos-cement (VLAC) water mains can sometimes cause excessive concentrations of a chemical called tetrachloroethylene to be found in consumers' drinking water.

Q. What is tetrachloroethylene and how does it get from the pipe to the water?

A. Tetrachloroethylene, also called perchloroethylene or PCE, is a common industrial solvent. It is used, for example, in degreasing operations during manufacture of electronics equipment, and in dry cleaning. In the case of VLAC pipe, PCE was the primary component in the manufacture of the vinyl lining. PCE can leach from the lining into the drinking water. The longer the water is in contact with a VLAC, the more PCE can enter the water.

Q. Why was this kind of water pipe ever used?

A. The vinyl lining was developed in 1966-68 by the Johns-Manville Co. It was intended to reduce the leaching of asbestos and cement from the pipe into the water. Tests indicated it was successful in doing so, and that no measurable contamination resulted. The first VLAC pipe was installed in Providence, RI, in 1968. This type of pipe became very popular, and about 660 miles of the pipe were installed in Massachusetts by 1980.

Q. How was the use of VLAC pipe stopped?

A. During the period 1976-79, evidence mounted that VLAC pipe was leaching PCE into drinking water. Advances in analytical chemistry had led to instruments which could detect much lower levels of PCE than could be detected when the vinyl lining was first developed. Manufacture and sale of VLAC pipe was terminated in spring 1980.

Q. How much of this pipe is in Duxbury, and where is it?

A. Approximately 15 miles of this pipe are in use in Duxbury. A listing of streets with VLAC pipe is available from the Water Department. The Water Department also has a map showing the locations of the VLAC pipe.

Q. Will the PCE eventually disappear by itself?

A. Yes, but it takes a very long time. In the early 1980s, it was expected that the PCE would be essentially gone within about 7 years. This has proven not to be the case. Some VLAC pipes which are more than 20 years old are still leaching detectable quantities of PCE. It is possible that PCE will continue to leach from some pipes for the life of the pipe.

Q. What health concerns are associated with exposure to PCE in drinking water?

A. In the concentrations that are sometimes found in water systems today, there are possible cancer-causing effects during exposure over a very long term. According to the U.S. Environmental Protection (DEP), "This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time." Reference: 310 CMR 22.16(1)(e)48.

Q. What federal or state standards are there for exposure to PCE in drinking water?

A. EPA and DEP have established a Maximum Contaminant Level of (MCL) of 5 micrograms per liter (Ug/L) for PCE in drinking water. This is essentially the same thing as 5 parts per billion (ppb). There also are other standards for exposure to PCE in air, but these standards are not nearly so stringent as the drinking water standard.

Q. When was this drinking water standard adopted?

A. EPA formally proposed the 5 parts per billion standard on May 22, 1989 in the Federal Register. EPA then promulgated this standard on January 30, 1991 in the Federal Register, and it took effect 18 months later (July 30, 1992). The Autumn 1992 edition of the "Massachusetts Drinking Water Standards and Guidelines" was the first edition to include the 5 ppb

standard for PCE. Earlier versions from 1989 on had included a 5 ppb guideline for PCE. Prior to the proposal of the 5 ppb standard, EPA and DEP guidelines listed higher levels (20-40 ppb).

Q. If my drinking water contains PCE but it is less than 5 parts per billion, is it safe to drink?

A. Ultimately, consumers will make this decision for themselves and their families. EPA and DEP regulations state the following, regarding cancer risk and the drinking water standard: "Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to tetrachloroethylene." Reference: 310 CMR 22.16(1)(e)48.

Q. Why do the PCE concentrations in Duxbury's 1997 samples vary so much?

A. PCE concentrations vary from street to street, from season to season, from hour to hour even at the same location, and because of unavoidable variation introduced by sampling and analytical protocol. Dead-end mains, for example, tend to have higher PCE concentrations than looped mains where water can continuously move. Streets with older mains may have less PCE than streets with newer mains, but there can be no guarantee about this as there was much variability in the amount of PCE used in the original manufacture of the pipe. Water removes faster through the distribution system in summer than winter because of variations in consumer demand; this may lead to higher concentrations in the winter. Water moves faster during certain times of day than others, leading to additional variations. Even when sampling protocol is followed perfectly, there is inevitably still some variability introduced. Finally, at levels of PCE under 10 ppb, laboratory analytical performance is considered acceptable by EPA if it is within $\pm$40% of the actual value.

Q. What options are there for reducing or eliminating PCE in the water redistribution system?

A. There are basically 3 strategies: to move the water faster through the pipes, to line the pipes, or to replace the pipes. Moving the water faster can be done by flushing (short-term measure only), bleeding (continuously withdrawing a small stream of water from the pipe), or looping (constructing a water main to eliminate a dead-end in the distribution system). Pipe linings act to separate the vinyl liner from the water, which reduces the leaching of PCE into the water. Pipe linings include installation of a cement-mortar lining, or establishment of a thin film by adding a DEP-approved water treatment chemical (zinc orthophosphate) at the supply sources. Pipe replacement completely eliminates the source of the PCE.

Q. How much would it cost to replace all 15 miles of pipe?

A. About $4,800,000. The project would have to be conducted over at least 2 years, and possibly more depending upon the degree of disruption from construction which Duxbury is willing to accept.